The Economic Value of Steller Sea Lion Protection


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Background

- The Steller sea lion (SSL) is the largest sea lion species
  - Up to 11 feet long and 2400 lbs
  - Eats ~10 tons/year
  - Mostly eat commercially-valuable fish

- Population declines of about 70% over the last 30 years have resulted in listing under the Endangered Species Act
  - Eastern stock
    - Listed as Threatened
  - Western stock
    - Listed as Endangered

Steller Sea Lion Population Trends
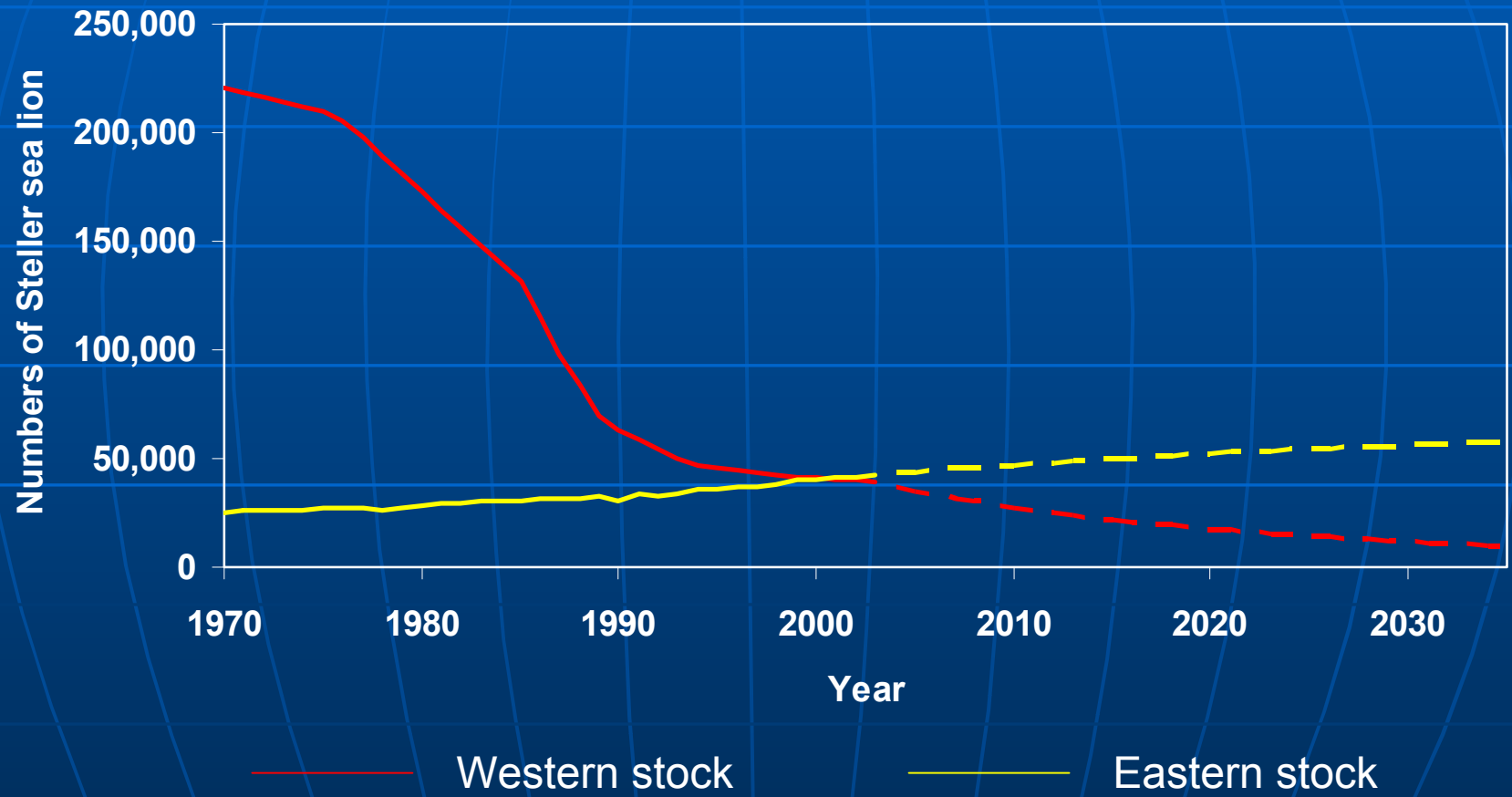
Steller Sea Lion Stocks and Population Estimates by Region
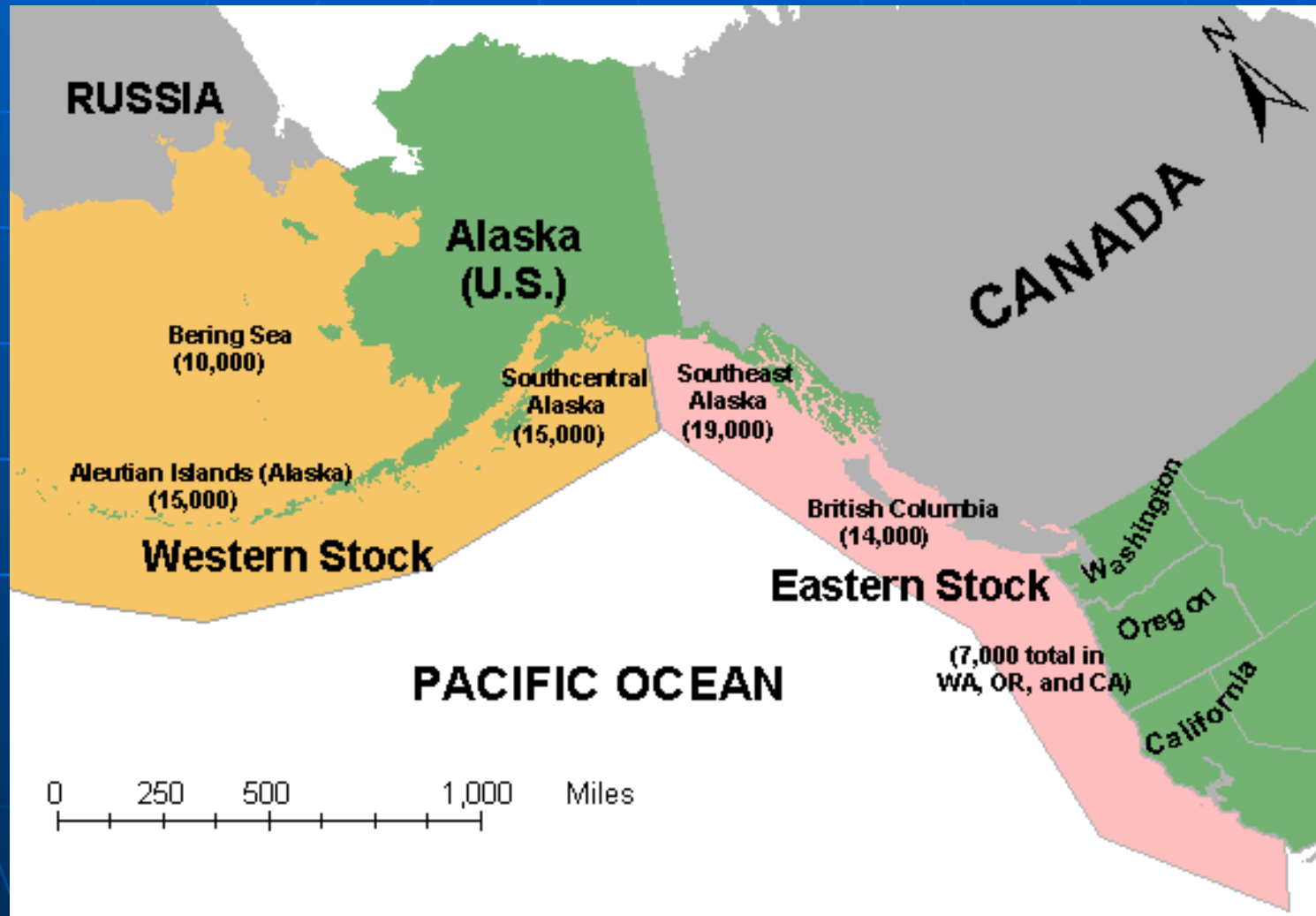
Causes of Decline and Protection Actions

- Main hypotheses of causes of continued decline in <u>Western stock</u>
  - Fisheries competition – reduce food supply
  - Predation – killer whales
  - Anthropogenic effects – shootings, entanglement, habitat disturbance
  - Disease, pollution, or environmental changes

- Fishery management protection actions taken in GOA and BSAI to protect the <u>Western stock</u>
  - Fishery-specific measures to disperse effort
  - Restricted zones

- Further actions considered in GOA and BSAI

What Information is Needed?

- Economic values for varying levels of protection
  - WTP for achieving various population sizes of W. stock
  - WTP for improving ESA listing status of W. stock

- Factors affecting these values (public preferences)
  - Substitutes and complements (Eastern stock levels and ESA listing status)
  - Geographic preferences (uniform protection, specific areas)
  - Timing

- Desired tool - A flexible valuation function
  - Depends upon important policy variables (population sizes, ESA status, etc.)
  - Can provide economic benefit information for a wide range of policies
  - Help to identify trade-offs and effects of marginal changes

Public Values for Steller Sea Lions

- Public values for SSL protection are the result of non-consumptive values people hold for SSLs
  - Nonuse motivations (e.g., existence values)
  - These values are the focus of study

- Measure using stated preference approaches
  - Ask people directly to reveal their preferences for public (non-market) goods through surveys
  - Commonly use contingent valuation method (CVM)

- Valuing threatened and endangered species
  - Hagen, et al., 1992 (CEP) – Northern spotted owl
  - Bowker and Stoll, 1988 (AJAE) – Whooping crane
  - See Mark Plummer's bibliography; Polasky biodiversity bibliography
  - Giraud, Turcin, Loomis, and Cooper (2002) – SSL ($61/hhold)
    - Valued single protection program
    - Didn't distinguish between Eastern and Western stocks

Steller Sea Lion Economic Study

- Stated preference approach
  - Use choice experiment or stated choice format to reveal preferences
    - Ask individuals to choose between alternatives with differing attributes
    - Can statistically estimate impact of attributes on WTP

- Provide sufficient context for valuation
  - Information on SSLs
  - Information on substitutes (species, issues)
  - Budget reminders

- Balancing information needs with parsimony

- Keeping it neutral
  - Pros and cons

- Evaluating survey materials
  - Focus groups
  - Cognitive interviews
  - Peer review

Description of the Survey

- 16-page color booklet-style survey
- Type of data collected
  - General attitudes and knowledge
    - Threatened and endangered species
    - Steller sea lions and other seal and sea lion species
    - Alaska commercial fisheries
    - Impacts of Steller sea lion protection actions
  - People's preferences revealed through choices between protection alternatives that vary in attributes and costs
    - Attributes are the results of the protection alternatives
      - Population sizes
      - ESA listing status
      - Geographic distribution (Eastern vs. Western, micro-geographic locations)
  - Socioeconomic, demographic, and other classification information

Sample Stated Choice Question

	Results in 60 years for each alternative		
	Alternative A Current program	**Alternative B**	**Alternative C**
Western Stock Population status………………… (Endangered now)	Endangered	Threatened	Recovered
Total population…………………… (40,000 now)	Nearly extinct Less than 1,000	75,000	200,000
Areas where they will live…………… (Compared to where they now live)	Very few areas	In most areas	In most areas
Eastern Stock Population status…………………… (Threatened now)	Recovered	Recovered	Recovered
Population size…………………… (40,000 now)	60,000	80,000	80,000
Added cost to your household each year for 20 years…………………	$0	$45	$75
Which alternative do you <u>prefer the most</u>? *Check one box------>*	**Alternative A** ☐	**Alternative B** ☐	**Alternative C** ☐
Which alternative do you <u>prefer the least</u>? *Check one box------>*	☐	☐	☐

About the Stated Choice Questions…

- Asks for most preferred and least preferred alternatives
  - Allows ranking of preferences
  - Increases statistical efficiency

- Asks each respondent multiple questions
  - To "cover a range of possible alternatives and costs"
  - Reflects uncertainty

- Payment vehicle is the added annual cost for next 20 years
  - Seafood and fish-related goods
  - Federal taxes

- Experimental design is in development
  - Combination of attributes and attribute levels
  - Investigating a Bayesian approach

- Random utility-based discrete choice econometric models
  - Multinomial logit models
  - Random parameters models (Layton and Brown, 2000, REStat)
  - Latent choice models (Boxall and Adamowicz, 2002, ERE)

Survey Implementation Plan

- Dillman (2000) Tailored Design Method – mixed mode procedure
  - Advance letter, initial mailing, postcard reminder, and telephone interview
  - Additional contact as needed
  - Financial incentive

- Random sample drawn from all U.S. households
  - Alaska households are over-sampled (target ~300 completes)
  - Non-Alaska households – targeting 1200 completed surveys

- Target response rate ≥60%
  - >70% in previous surveys using similar approaches but for specialized populations and for more familiar goods

- Non-response
  - Follow-up phone interviews collect information to understand differences between respondents and non-respondents

Survey Implementation Issues

- Sample mode - Knowledge Networks
  - WebTV survey format
  - Pre-recruited panels
  - Lots of data on panel participants
  - Paperwork Reduction Act obstacles
    - Concerns with panel attrition, recruit rates, and overall response rates
    - Special cases okay (hard-to-find populations, experimental studies)

- Sample coverage (all U.S. households)
  - RDD has low response rates (<50%)
  - U.S. Postal Service's Delivery Sequence File
    - No longer being sold – Privacy Act concerns
    - Vendors use to update databases
  - Evaluating sample vendors
    - Survey Sampling, International – marketing research
    - Axciom – direct marketer
    - Experian – direct marketer
    - Genesys – marketing research
    - Trade-off coverage and phone numbers for non-respondents